

of truth, by the continued action of the points of the compasses in the divisions on their surfaces.

Having thus explained the mode of using the common scales, we now proceed to describe the arrangement of the improved drawing scales; after which, we shall point out the advantages and pleasure obtained by employing them in every case, when such scales are applicable.

We will quote from Mr. Smith's description: No. 1 scale contains, on the first edge scales of $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1 inch to the foot.

2nd edge $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, and $1\frac{1}{2}$ inch to the foot. In the middle is a scale of chords for an arc of 3 inches radius.

3rd edge $\frac{1}{16}$, $\frac{1}{8}$, $\frac{3}{16}$, and $\frac{1}{2}$ of an inch to the foot.

4th edge 5, 10, 20, and 40 chains to the inch. No. 2 scale contains the same scales as those on the 1st and 2nd edge, and as in the middle of No. 1.

3rd edge contains scales of 5 chains (horizontal), and of 50 feet (vertical) to the inch.

4th edge contains scales of 20 chains (horizontal) and of 100 feet (vertical) to the inch.

Boxwood scales from 7s. 6d., and ivory scales 15s. each.

Scales expressly arranged for use in the practice of Isometric Projection.

No. 3 scale contains on the 1st edge scales of $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1 inch to the foot; these scales may be used in measuring all lengths for parts of objects that are either placed on the isometric plane, parallel to the intersecting line, or of all parts parallel to the picture.

On the 3rd edge are reduced scales of $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1 inch to the foot; these scales may be used in measuring all lengths for parts of objects that are either placed on the isometric plane inclined at an angle of 45° to the intersecting line, or of all parts parallel to such positions.

On the 4th edge are reduced scales of $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1 inch to the foot; these scales may be used in measuring all lengths for parts of objects that are either placed on the isometric plane inclined at right angles to the intersecting line, or of all parts parallel to such positions. On the same side are two elliptic protractors.

On the 2nd edge is a scale of chords. Boxwood scales 10s., and ivory scales 20s. each.

No. 4 scale contains on the 1st edge, scales of $\frac{1}{4}$ and $\frac{1}{2}$ of an inch to the foot.

2nd edge, $\frac{1}{8}$ and 1 inch to the foot. In the middle is a scale of chords for an arc of $1\frac{1}{2}$ inch radius.

Boxwood scales 3s. to 4s., and ivory scales 7s. to 8s. each.

No. 5 scale contains on the 1st edge, scales of 5 and 10 chains to the inch.

2nd edge, 20 and 40 chains to the inch. In the middle is a scale of chords for an arc of $1\frac{1}{2}$ inch radius.

Boxwood scales 3s. to 4s., and ivory scales from 7s. to 8s. each.

(These scales will be transmitted by post for 2d. extra.)

Nos. 1 and 4 will be found well worthy the attention of all architects, builders, surveyors, and mechanical draughtsmen.

Nos. 2 and 5 will be found of invaluable service to practical land surveyors, and to civil and military engineers; and

No. 3 combine such advantages, as must gratify those who take any pleasure or interest in isometrical drawing.

All the scales of equal parts are so devised, that they, with their subdivisions of the fractional parts of each, can be clearly and distinctly read off from an edge of the instrument, and they are further figured, so that the whole parts may be read off from left to right, or in that direct manner in which we are accustomed to read and write. In using these scales, all that is required of the practitioner is to place the whole, or subdivisional part, at use point in the drawing, and the edge of the instrument by the given line, and then to work off with a sharp-pointed black-lead pencil a point opposite to the proposed division of the scale; for instance, let it be required to plot off from the $\frac{1}{4}$ inch scale, 9 feet 7 inches towards the right.

Place the 7th subdivisional part at the given point, then look along the scale for the 9th equal part, which will be found to be produced

to the edge of the instrument, and with a pencil mark off the given length on the proposed line.

If it is required to plot off the former length towards the left, place the 9th equal part at the given point, and from the 7th subdivisional part, mark off the given length on the proposed line.

By carefully reflecting on this simple mode of plotting any dimensions, it must plainly appear that only one-third the usual time, with a decreased wear and tear of the eyes, will be required in any such operation, and from practical experience in this matter, we beg to assure our readers that under ordinary circumstances, a draughtsman may, with greater ease and pleasure than he could otherwise accomplish, execute at least three times the quantity of outlines in a given time; but this is not the only advantage attending the use of these instruments, for he it remembered, that a great part of the dimensions required to be plotted by building, mechanical, and architectural draughtsmen have to be divided into two equal parts, and as it is the general custom to burden the memory with the operation of determining the halves of such dimensions, the experienced draughtsman, by merely glancing at the arrangement of these scales, will readily perceive that in the greater number of instances he may, by employing them, entirely avoid the tedious process.

Looking at No. 1 scale, we find it contains on the 1st edge scales of $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1 inch to the foot; now let us assume a person engaged in drawing the plans and elevations of a steam-engine, from the $\frac{1}{4}$ inch scale; and let it be required to plot the length of the radius of the interior of the steam cylinder, the diameter being 3 feet 5 $\frac{1}{2}$ inches:—by the common method, he would proceed to determine the half of 3 feet 5 $\frac{1}{2}$ inches, which would be 1 foot 8 $\frac{1}{4}$ inches; this he would plot off from the $\frac{1}{4}$ inch scale, but by having one of the improved scales, he would merely plot off 3 feet 5 $\frac{1}{2}$ inches from the $\frac{1}{4}$ inch scale; that is, from a scale every equal and subdivisional part of which is only one-half the length of the corresponding parts on the $\frac{1}{4}$ inch scale.

This example will be sufficient to open the minds of our readers on this subject; but we proceed to give another:—Let a person be employed in executing a proportional drawing of an object or objects from the 1 inch scale, then might the half of any dimension be plotted from the $\frac{1}{2}$ inch scale; the fourth of any dimension from the $\frac{1}{4}$ inch scale, the eighth of any dimension from the $\frac{1}{8}$ inch scale, and many other parts of the same dimension, from several other scales on No. 1.

Further, these scales are well adapted for plotting off dimensions, whilst engaged in executing enlarged or diminished copies of any drawings; in these cases they serve in place of a pair of proportional compasses.

These examples and illustrations, it is hoped, will prove sufficient to convince all who have carefully perused this article, and who have had any experience in drawing, of the great advantages that will be derived by the use of these valuable and essential instruments in their daily practice.

Our readers will perceive from an advertisement which appeared in a late number of THE BUILDER, that they may obtain the scales at our office, No. 2, York-street, Covent Garden.

But to return to our description of the use of the remaining mathematical instruments, named in the former part of this article.

After the outlines of the proposed representation are lined in by a good IIII pencil, and the bow-pencil, &c. it is then requisite to retrace these lines with some water colour, which must be prepared on the pallet.

By means of the drawing-pen, all straight lines may be finished; the bow-pens must be used to retrace all circles and circular arcs, with radii from $\frac{1}{4}$ of an inch to 2 inches in length; and all larger circles and circular arcs, with the second pair of compasses fitted out with the pen point or lengthening bar and pen point. The colour of the lines must be regulated by the manner in which it is proposed to finish the drawing: in some instances the representations consist of mere outlines: in such cases Indian ink ought in general to be used, whilst any particular positions or parts may be lined with red or blue; in these cases it will add much to the effect of the represen-

tation, if the draughtsman will assume some plausible direction for the rays of light to fall on the real or assumed object; then by executing all parts on which the light may fall by these lines, and the remaining lines in shadow by thick lines, the drawing will be found almost equal in effect to those which are tinted in sepia, Indian ink, or with a variety of colours.

When the representations are to be tinted with sepia, after completing the outlines in pencil, retrace them with a light tint of sepia, then, clean the surface of the paper, and proceed and lay on the requisite shades, and after that work in a clean and careful manner each part of the representation according to the common or established rules of shading; allow the drawing time to dry, and once more retrace the outlines of the various parts with thin lines of a light tint of sepia.

Proceed in the same manner with those representations which it is proposed to tint with Indian ink, being careful to retrace the outlines with a light tint of the same colour, and after finishing the shading, the outlines may either be retraced with thin light lines or finished with thin and thick lines in the manner alluded to in the first instance.

When the representations are to be tinted with a variety of colours, the outlines of architectural objects should be retraced with thin lines of a light tint of burnt sienna or burnt umber; and the outlines of mechanical, and the greater number of engineering drawings, with a light tint of Indian ink.

After having carefully completed the shading of the various parts, their outlines should, in those instances where it is intended to make a highly-finished drawing, be retraced with thin lines of the colour that the parts are shaded with; in some cases, particularly in coloured working drawings, it is customary to finish the outlines with thin and thick lines of a deep tint of Indian ink; whereas, amongst many surveying and architectural draughtsmen, who have frequently to execute pictorial representations of buildings, combined with the local town or country scenery, they, in order to avoid any harsh regularity of outline, in general prefer to leave the original outlines in pencil, and, after erasing all superfluities, at once proceed to tint the representations with sepia, Indian ink, or other suitable colours.

GROWING TASTE FOR ARCHITECTURE.

MUCH it to be deplored that the Fine Arts, and more especially Architecture, have been in England so little appreciated, or rather so grievously neglected. The bad effects of that narrow and selfish policy which has withheld the Government of this country—and of this country alone—from supporting the Arts, is beginning to be developed. At this very time we find ourselves with a redundant population for whom no employment can be found—and our manufactures beaten out of the markets abroad by the superior taste displayed by foreigners—which, as a manufacturing and commercial nation, we cannot too deeply deplore, nor too speedily repair. But, alas! art and taste are of slow, not sudden growth, and call for careful culture.

Another evil consequence has now arisen, an evil which for a time must inevitably occasion much distress at home. We allude to the rapid extension of railroads on the Continent. As they extend, so will the rage for foreign travel increase; and money, which might have been circulated at home, will be spent abroad. And why? What is it that attracts so many thousands of our countrymen—and those many of them in the humble walks of life—to Paris, to Munich, to Berlin, and as far again? It is the splendour of the public buildings, the splendour of the public galleries, both of paintings and statues—the museums—the libraries—the churches and cathedrals (*always open*)—the beautiful gardens, adorned with fountains, statues, and architectural embellishments, and, above all, that wise and liberal spirit, which renders all these luxuries—luxuries to the people at large; for abroad, the happiness of the rich is often found to consist, not merely in promoting, nor yet beholding, but actually in participating in, the innocent amusements and rational enjoyments of the poor.

It is not surprising, therefore, that such of our countrymen as thirst for intellectual pleasures, should seek abroad for what they cannot